119

Tuna Newsletter

LIBRARY
DEC 19 1995
National Marine Fisheries Service
2570 Dole Street
Honolulu, Hawaii

National Marine Fisheries Service
- **Southwest Region**
- **Southwest Fisheries Science Center**

November 1995 **Issue 119**

IN THIS ISSUE

- U.S. Canned Tuna Industry Highlights, 2nd Quarter 1995 ...1
- U.S. Tuna Fisheries Update 2
- The PICOLO Research Program: An Analysis of the Relationship Between Oceanic Productivity and Tunas 5
- Tuna Tagging in the Maldives 7
- Recent Developments in Tuna Fisheries: News from Around the World 8

U.S. TUNA STATISTICS

Editor's note: The following articles were prepared by NMFS personnel from data and information gathered from sources in the U.S. tuna industry and government.

U.S. CANNED TUNA INDUSTRY HIGHLIGHTS, SECOND QUARTER 1994

Total receipts of tuna by U.S. canners during the second quarter of 1995 (April-June) increased by 14% to the equivalent of 118,600 short tons (st) of whole fish (round weight), compared to the second quarter of 1994 (Table 1). The principal species received was skipjack tuna with 63% of the total, followed by albacore and yellowfin tuna, with 24% and 13% of the total, respectively. Skipjack tuna and albacore receipts were up by 42% and 11%, respectively, for the quarter, while yellowfin tuna receipts were down by 38%.

Receipts for the first two quarters of 1995 totaled 237,000 st, up 11% from the previous year (Table 2). Skipjack tuna and albacore receipts were up by 41% and 4%, respectively, while yellowfin tuna receipts were down by 40%.

Although the vast majority of tuna received by U.S. canners is whole fish, some quantity is received as loins or gilled-and-gutted. Receipts of tuna loins for the second quarter of 1995 were up by 57%, while receipts of loins for the first two quarters were up by 39%. (The round weight totals used above were approximated by converting weights of loins and gilled-and-gutted receipts by factors of 2.25 and 1.11, respectively. For the remainder of

Table 1. Total U.S. cannery receipts (st) by species for the second quarters of 1994 and 1995. Totals may not add due to rounding.

Apr-Jun	Type	Albacore	Skipjack	Yellowfin[1]	TOTAL
1994	ROUND	25,900	45,200	18,300	89,400
	GILLED & GUTTED	0	0	200	200
	LOIN	*	3,100	3,100	6,300
	TOTAL (as received)	25,900	48,300	21,600	95,800
	TOTAL (round weight)[2]	26,000	52,200	25,500	103,700
1995	ROUND	28,700	55,200	12,300	96,200
	GILLED & GUTTED	0	0	100	100
	LOIN	*	8,400	1,500	9,900
	TOTAL (as received)	28,700	63,600	13,900	106,200
	TOTAL (round weight)[2]	28,800	74,100	15,700	118,600

*Less than 100 st reported for this category.

[1]May include a small amount of bigeye tuna.

[2]Converted to round weight by using factors of 1.11 for gilled-and-gutted and 2.25 for loins.

Table 2. Total U.S. cannery receipts (st) by species for the first two quarters of 1994 and 1995. Totals may not add due to rounding.

Jan-Jun	Source	Albacore	Skipjack	Yellowfin[1]	TOTAL
1994	ROUND	51,500	91,400	38,600	181,600
	GILLED & GUTTED	*	*	400	400
	LOIN	*	6,800	7,000	13,800
	TOTAL (as received)	51,500	98,300	46,000	195,800
	TOTAL (round wt)[2]	51,600	106,800	54,700	213,100
1995	ROUND	53,800	113,500	26,100	193,400
	GILLED & GUTTED	0	0	400	400
	LOIN	*	16,400	2,800	19,200
	TOTAL (as received)	53,800	129,800	29,400	213,000
	TOTAL (round wt)[2]	53,800	150,300	32,900	237,000

*Less than 100 st reported for this category.
[1]May include a small amount of bigeye tuna.
[2]Converted to round weight by using factors of 1.11 for gilled-and-gutted and 2.25 for loins.

Table 3. U.S. cannery receipts (st) of domestic and imported tuna by species for the second quarters of 1994, 1995 and the recent (1990-94) second quarter averages. Totals may not add due to rounding.

Apr-Jun	Source	Albacore	Skipjack	Yellowfin[1]	TOTAL
AMERICAN SAMOA & CALIFORNIA					
1994	DOMESTIC	500	26,100	4,100	30,700
	IMPORTED	7,800	6,500	3,800	18,200
	TOTAL	8,300	32,700	7,900	48,900
1995	DOMESTIC	200	26,800	4,500	31,600
	IMPORTED	10,500	6,400	700	17,600
	TOTAL	10,700	33,200	5,200	49,200
1990-94 Average	DOMESTIC	1,000	23,700	12,000	36,800
	IMPORTED	6,800	9,000	5,100	20,800
	TOTAL	7,800	32,700	17,100	57,600
PUERTO RICO					
1994	DOMESTIC	*	6,700	3,900	10,600
	IMPORTED	17,700	8,900	9,800	36,400
	TOTAL	17,700	15,700	13,700	47,000
1995	DOMESTIC	*	13,900	3,800	17,700
	IMPORTED	18,000	16,500	4,800	39,200
	TOTAL	18,000	30,400	8,600	57,000
1990-94 Average	DOMESTIC	*	5,500	5,500	11,000
	IMPORTED	17,100	15,300	10,200	42,600
	TOTAL	17,100	20,800	15,700	53,600
TOTAL					
1994	DOMESTIC	500	32,900	8,000	41,300
	IMPORTED	25,500	15,500	13,600	54,500
	TOTAL	25,900	48,300	21,600	95,800
1995	DOMESTIC	300	40,700	8,300	49,300
	IMPORTED	28,500	22,800	5,600	56,900
	TOTAL	28,700	63,600	13,900	106,200
1990-94 Average	DOMESTIC	1,000	29,200	17,500	47,800
	IMPORTED	23,900	24,300	15,200	63,400
	TOTAL	24,900	53,500	32,800	111,200

*Less than 100 st reported for this category.
[1]May include a small amount of bigeye tuna.

this article, unconverted receipts are used unless otherwise stated.)

Receipts of tuna in American Samoa and California for the second quarter of 1995 were up by less than 1%, compared to the second quarter of 1994, with increases in albacore and skipjack tuna receipts more than offsetting a decrease in yellowfin tuna receipts (Table 3). Total receipts in Puerto Rico were up by 21%, primarily due to a 94% increase in skipjack tuna receipts.

Domestic deliveries to U.S. canners for the first two quarters of 1995 increased by 18%, while imported deliveries increased by 1% (Table 4). Skipjack tuna was easily the largest component of all domestic deliveries at 82,000 st, followed by yellowfin tuna, 16,800 st, and albacore, 2,500 st. Domestic deliveries accounted for 48% of the tuna received by U.S. canners.

Albacore was the leading import for the second quarter of 1995 at 28,500 st, followed by skipjack and yellowfin tuna at 22,800 st and 5,600 st, respectively (Table 5). The leading supplier was Taiwan, with 39% of the import market, followed by France and Japan, with 16% and 10% of the market, respectively.

The western Pacific Ocean was the main source of all three important tuna species (Table 6): skipjack tuna (48,700 st), albacore (13,200 st) and yellowfin tuna (7,500 st).

U.S. imports of canned tuna packed in water totaled 20,300 st for the second quarter of 1995, up 10% from 1994. For the first six months of 1995, imports of canned tuna totaled 61,900 st, down 22% from the previous year.

U.S. TUNA FISHERIES UPDATE

EASTERN PACIFIC TROPICAL TUNA FISHERY

During the period January through September 1995, 8 U.S.

Table 4. U.S. cannery receipts (st) of domestic and imported tuna by species for the first two quarters of 1994, 1995 and the recent (1990-94) averages. Totals may not add due to rounding.

Jan-Jun	Source	Albacore	Skipjack	Yellowfin[1]	TOTAL
1994	DOMESTIC	800	66,700	18,200	85,600
	IMPORTED	50,700	31,600	27,900	110,200
	TOTAL	51,500	98,300	46,000	195,800
1995	DOMESTIC	2,500	82,000	16,800	101,400
	IMPORTED	51,300	47,800	12,600	111,600
	TOTAL	53,800	129,800	29,400	213,000
1990-94 Average	DOMESTIC	3,000	60,000	30,600	93,600
	IMPORTED	43,700	43,500	26,500	113,800
	TOTAL	46,700	103,600	57,100	207,400

[1]May include a small amount of bigeye tuna.

Table 5. U.S. cannery imports (st) of tuna by species and source (flag of catcher vessel) for the second quarter of 1995. Totals for the second quarter of 1994 are given for comparison. Note that the flag of the catcher vessel does not necessarily reflect the country of export or point of shipment. Totals may not add due to rounding.

VESSEL FLAG	1995				1994
	Albacore	Skipjack	Yellowfin[1]	TOTAL	TOTAL
ECUADOR	0	1,500	800	2,400	3,600
FSM	0	700	300	1,000	100
FRANCE	400	6,300	2,300	9,000	11,300
INDONESIA	100	200	0	300	*
JAPAN	5,600	200	0	5,700	5,900
NEW ZEALAND	1,700	*	*	1,800	1,400
PANAMA	100	2,500	600	3,200	1,000
SOLOMONS	*	1,600	200	1,800	700
SOUTH AFRICA	2,300	0	0	2,300	2,600
SOUTH KOREA	100	3,000	700	3,900	5,400
TAIWAN	17,700	4,100	400	22,200	17,100
USA	0	1,100	*	1,200	400
VANUATU	0	300	*	300	500
UNKNOWN	0	1,300	0	1,300	700
OTHER	400	100	100	600	3,900
TOTAL	28,500	22,800	5,600	56,900	54,500

*Less than 100 st reported for this category.
[1]May include a small amount of bigeye tuna.

tuna purse seiners participated in the eastern tropical Pacific tuna fishery and caught an estimated 13,200 metric tons (mt) of yellowfin and bigeye tuna and 9,900 mt of skipjack tuna (Figure 1). The combined yellowfin and bigeye tuna catch was down 13% from the 1994 catch for the same period while the skipjack tuna catch was down 6%. The drop in catches in 1995 is largely due to a decrease in the size of the U.S. fleet which consisted of 12 active seiners during the same period in 1994. The fleet continues to concentrate its effort on tunas not associated with dolphins.

During this same period, the surface fleets of all nations fishing in the eastern Pacific Ocean caught an estimated 202,200 mt of yellowfin and bigeye tuna and 88,600 mt of skipjack tuna. The leading nation was Mexico with 39% of the total catch, followed by Venezuela and Ecuador with 14% and 13% of the catch, respectively. The U.S. fleet accounted for 8% of the tuna catch.

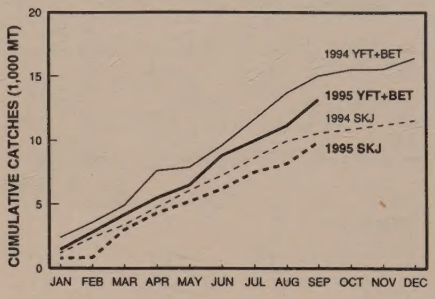

Figure 1. Cumulative tuna catches, by month, for the U.S. eastern Pacific purse seine fishery, 1994 and 1995.

WESTERN PACIFIC TROPICAL TUNA FISHERY

For the period January through September 1995, U.S. tuna purse seiners registered to fish in the western tropical Pacific under the South Pacific Tuna Treaty landed an estimated 116,700 mt of skipjack tuna and 20,700 mt of yellowfin and bigeye tuna (Figure 2). The skipjack tuna landings were up 14% from the 1994 landings for the same period (102,100 mt) and the combined yellowfin and bigeye tuna landings were down 51% (from 42,100 mt). In 1995 through September, 42 vessels completed 137 fishing trips

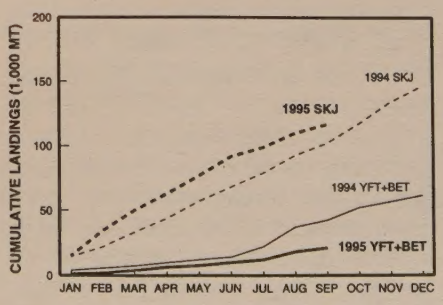

Figure 2. Cumulative tuna landings, by month, for the U.S. western tropical Pacific purse seine fishery, 1994 and 1995.

Table 6. Receipts (st) of tuna by U.S. canneries by species and area of capture for the second quarters of 1994 and 1995. Totals may not add due to rounding.

SOURCE	Albacore		Skipjack		Yellowfin[1]	
	1994	1995	1994	1995	1994	1995
E. ATLANTIC OCEAN						
DOMESTIC	0	0	0	0	0	0
IMPORTED	7,300	7,500	2,900	1,900	1,300	500
TOTAL	7,300	7,500	2,900	1,900	1,300	500
W. ATLANTIC OCEAN						
DOMESTIC	0	*	0	0	0	0
IMPORTED	6,400	5,200	*	*	*	*
TOTAL	6,400	5,200	*	*	*	*
E. PACIFIC OCEAN						
DOMESTIC	0	*	2,700	2,600	2,900	2,400
IMPORTED	100	300	1,500	3,600	3,300	1,100
TOTAL	100	300	4,100	6,200	6,200	3,500
W. PACIFIC OCEAN						
DOMESTIC	500	200	30,200	38,200	5,100	5,900
IMPORTED	9,700	13,000	6,300	10,500	3,100	1,600
TOTAL	10,200	13,200	36,500	48,700	8,200	7,500
INDIAN OCEAN						
DOMESTIC	0	0	0	0	0	0
IMPORTED	2,000	2,600	4,700	6,800	5,900	2,400
TOTAL	2,000	2,600	4,700	6,800	5,900	2,400

*Less than 100 st reported for this category.

[1]May include a small amount of bigeye tuna.

compared to 44 vessels and 166 trips in 1994. *(Report provided by Doug Prescott, NMFS Southwest Fisheries Science Center, La Jolla, CA)*

NORTHERN PACIFIC ALBACORE FISHERY

The 1995 U.S. North Pacific albacore troll season began in early May 1995 when vessels began searching for fish in areas north of Midway Island between 33°N and 39°N near the international dateline. Vessels fished eastward in June and July. By August fishing effort was concentrated in the area from 145°W to 153°W between 41°N and 44°N, where a large aggregation of fish was found in late August. Good fishing developed near the U.S. west coast and off the northern end of Vancouver Island, Canada, in August and September. By the end of September, fishing in these areas became sporadic as weather conditions deteriorated and fish scattered. Similar to last season, albacore were available within 100 nm of the coasts of Washington and Oregon. Limited catches were reported near the coast of central and southern California. The preliminary estimate of total landings for the 1995 North Pacific season is 10,500 mt, however some vessels are still fishing and landings data continue to be received. The total landings for the 1994 season were 11,170 mt. Catch rate and length-frequency data from the 1995 season are not yet available. *(Report provided by John Childers, NMFS Southwest Fisheries Science Center, La Jolla, CA)*

SOUTHERN PACIFIC ALBACORE FISHERY

The 1994-95 U.S. South Pacific albacore fishery began in December 1994 and ended in April 1995. Approximately 21 U.S. troll vessels participated in the fishery, compared to 14 vessels in the 1993-94 fishery. The fleet was small due, in part, to the poor catches in recent years and concerns about the effects of *El Niño* conditions on the availability of albacore to troll gear this season. This season, excellent catches were reported in the area between 37°S and 40°S and from 150°W to 170°W. Preliminary estimate of the catch rate for the fleet is 156 fish per day, compared to 79 fish per day for the 1993-94 South Pacific season. Preliminary total landings from U.S. vessels are approximately 2,200 mt, an increase of more than 200% over the previous season's total of 603 mt. Logbooks have been received for approximately 18 trips. Length-frequency samples were collected from approximately 20 trips and a total of 1,400 fish. The average fork length of albacore caught was approximately 70 cm (17 lbs or 8 kg) compared to 66 cm (15 lbs or 6.7 kg) for the 1993-94 season. *(Report provided by John Childers, NMFS Southwest Fisheries Science Center, La Jolla, CA)*

WESTERN ATLANTIC BLUEFIN TUNA FISHERY

The 1995 bluefin tuna fishery was punctuated by the implementation of several new regulations that include: (1) monthly quotas and no-fishing days to control fishing effort in the General Category; (2) allocation of the 1995 U.S. domestic quota (1,329 mt) among four commercial and one recreational categories; (3) extend vessel permit requirements to dealers, commercial (by November 15, 1995) and recreational vessels (by January 1, 1996) that fish for, land, sell or purchase regulated Atlantic tunas; (4) adjust trip and bag limits in the recreational bluefin tuna fishery; and (5) imple-

Table 7. U.S. commercial landings of Atlantic bluefin tuna for 1995 through October 6.

Category	Number of Fish	Avg. Wt. (lbs)	Gross Wt. (mt)	Quota (mt)
GENERAL	2,858	424	549	560
Handline	320	453	66	—
Rod & Reel	2,431	420	463	—
Harpoon	107	421	20	—
HARPOON	312	399	56	57
INCIDENTAL	280	516	66	115
N. Longline	123	442	25	38
S. Longline	150	587	40	75
Other	7	308	1	2
PURSE SEINE	1,158	385	202	250
ANGLING	13	334	2	4
RESERVE	17	322	2	3
TOTAL	4,638	417	878	989

ment a 22-inch total curved fork length minimum possession size for yellowfin and bigeye tuna.

Landings in the General Category (commercial handgear) were off this year due to a reduction in quota (Table 7). A total of 2,858 large medium or giant size class bluefin tuna were landed. The average weight of bluefin landed this year, 424 lb, was slightly up from the 1994 average weight of 366 lb. Total harvest to date stands at 549 mt. This category closed September 12 and reopened October 1, for the New York Bight area only, with 10 mt to be harvested.

The Harpoon Category harvested 56 mt of bluefin tuna. The average weight of bluefin landed by harpooners was 399 lb, up from last year's average of 360 lb. A total of 312 bluefin was landed by harpoon vessels. This category closed on August 11, about one month sooner than its traditional mid-September closure. High catch rates, due to good weather and coordination with spotter planes, contributed to the early closure.

The Incidental Catch Category, primarily comprised of longline vessels, continue to land bluefin tuna, albeit with low catch rates. Vessels targeting other pelagic species have landed 280 bluefin tuna so far this year or 66 mt. The average weight of incidentally caught bluefin tuna is 516 lb.

Five permitted purse seine vessels have harvested 1,158 bluefin tuna with an average weight of 385 lb. To date, purse seine vessels have landed 202 mt of bluefin tuna. Most of these fish are shipped overseas fresh to the Japanese market.

Thirteen bluefin tuna were harvested by sportfishermen under the Angling Category trophy fish bag limits. Finally, NMFS authorized the New England Aquarium to harvest 17 bluefin tuna for scientific purposes. *(Report provided by Kevin B. Foster, NMFS Northeast Region, Gloucester, MA)*

REPORTS

Editor's note: Original reports are published as a service to subscribers and may not represent the views of the NMFS. Readers should contact the authors of reports for details, if needed.

THE PICOLO RESEARCH PROGRAM: AN ANALYSIS OF THE RELATIONSHIP BETWEEN OCEANIC PRODUCTIVITY AND TUNAS

Alain Fonteneau, ORSTOM[1] Scientist, Inter-American Tropical Tuna Commission, 8604 La Jolla Shores Drive, La Jolla, CA 92037-1508

A new and important tuna fishing zone has been intensively exploited by purse seiners during recent years in the Eastern Atlantic. This new fishery is centered at 3°N and 15°W, as shown in Figure 3. Until recently, this area was considered to be a typically oligotrophic area, a poor area with low primary and secondary productivity. However, a more detailed study of the oceanographic conditions in this area has shown recently that this area is permanently and intensively swept by oceanic waves, similar to the waves described in the Pacific ocean by Legekis in 1977.

[1]ORSTOM: French Institute of Scientific Research for Development in Cooperation, 209-213 rue La Fayette, 75480 Paris Cedex 10, France.

'Tuna Newsletter' Now Available on the Web

The 'Tuna Newsletter' is now available on the Internet's World Wide Web. Each issue will be posted to the Web at about the same time that it is mailed to regular subscribers. Back issues will be posted as time permits. Currently the February, May and August 1995 issues are available. The electronic version of the 'Tuna Newsletter' includes all the original text, tables and figures and also contains "hot links", email forms, etc., that make a Web site so useful. The 'Tuna Newsletter' is located at:

http://kingfish.ssp.nmfs.gov/swfsc/tunanews.html

These "Legekis waves" are in fact large-scale horizontal undulations in current flow, moving westward at a speed of 25 km per day. They are also associated with active vertical movements of the water masses in the surface layers (in the first 100 meters). These waves have been located by at-sea oceanographic observations (by buoys and research boats), by satellite, and by the results obtained from oceanic circulation models, such as the model "OPERA" used by French scientists. A typical result obtained from models is given in Figure 4 (taken from Morlière et al., 1994) showing the simulated sea surface temperature in this area.

Various research cruises recently conducted by the ORSTOM research team in the eastern Atlantic have shown that a huge biomass of a mesopelagic (living in deep waters) fish species, *Vinciguerria nimbaria*, was concentrated in the area, at least seasonally, and located, surprisingly, in the surface layers (night and day). An analysis of the stomach contents of the tunas fished in the area showed that this mesopelagic fish seems to be the most common food of the tunas in the area.

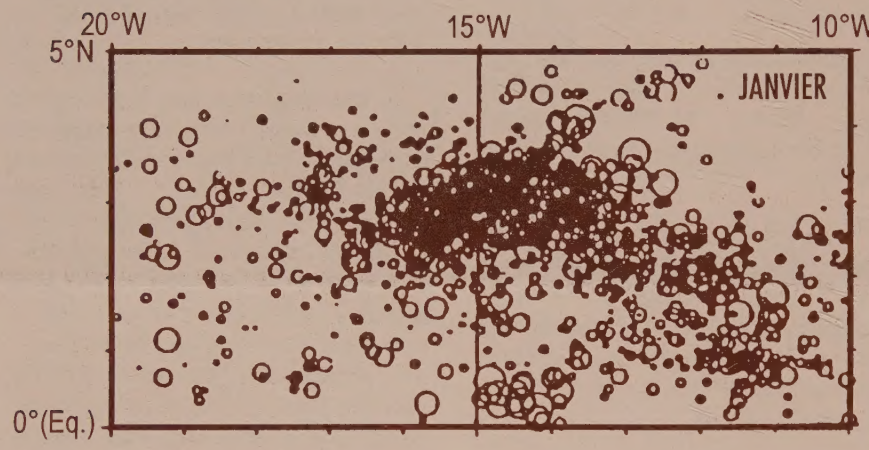

Figure 3: A typical fishing map of the PICOLO area: most of the catches by the purse seiners during January 1990 were located between 2° and 4°N, the area of most intense waves (Fonteneau, 1994).

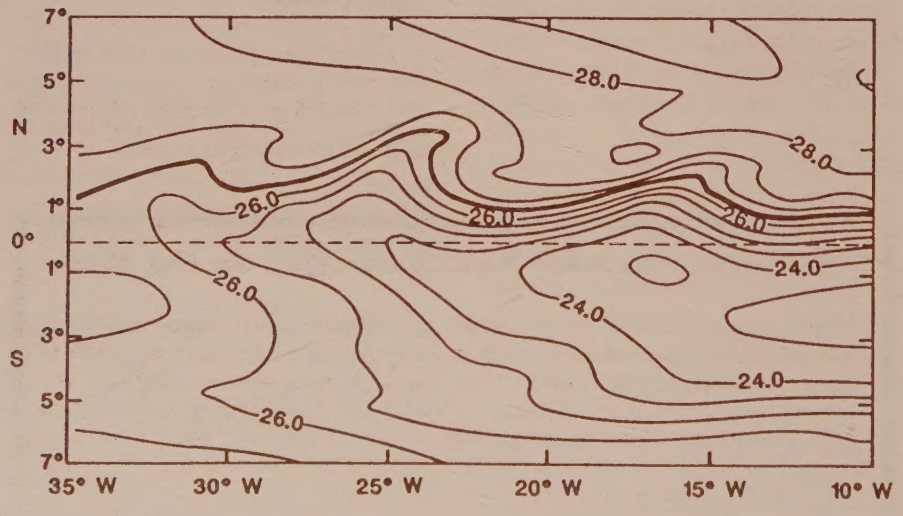

Figure 4: Sea surface temperatures simulated by the OPERA model in July 1990. The equatorial SST front is outlined (in thick line) by the 26.5° isotherm (Morlière et al., 1994).

The oceanic productivity resulting from the Legekis waves in the area, probably due to vertical movement of the water masses, seems to be high and similar to the productivity observed in well-studied coastal upwellings. Very localized and mobile upwelling and downwelling phenomena are always associated with the Legekis waves. However, the oceanographic and biological mechanisms linking the mesoscale waves and the biological productivity in this area are still entirely hypothetical.

A large and multidisciplinary research program, based in Abidjan, Ivory Coast, and called PICOLO (Productivity Induced in Convergence area by Long Oceanic Waves), was initiated by ORSTOM in 1994 to understand the physical and biological mechanisms leading to the high concentration of tunas in the area. Various research cruises using ad hoc oceanographic equipment and the new ORSTOM research vessel *Antea* will be conducted in the area during 1996 and 1997. This program is open to foreign scientists interested in international cooperation.

Further information on PICOLO can be obtained from the program manager, Alain Morlière, ORSTOM, 15 BP 917, Abidjan 15, Cote d'Ivoire (email: morliere@orstom.orstom.fr).

Literature Cited:

Fonteneau A. (1994). La zone Liberia: quelques éléments statistiques et de réflexions halieutiques. *ICCAT, Collective Volume of Scientific Papers*, 42(2):408-416.

Legekis R. (1977). Long waves in the eastern equatorial Pacific: A view from a geostationary satellite. *Science*, 197(4309):1179-1181.

Morlière, A., Le Bouteiller, A., and Citeau, J. (1994). Tropical instability waves in the Atlantic ocean: A contributor to biological processes. *Oceanologica Acta*, 17(6):585-596.

MORE TUNA TAGGING IN THE MALDIVES: TETRACYCLINE MARKING OF JUVENILE YELLOWFIN

Dr. R. Charles Anderson, Marine Research Section, Ministry of Fisheries and Agriculture, Male, Republic of Maldives (Fax: 960-326558)

During August 1995 a team of tuna researchers from the Maldivian Marine Research Section (MRS) tagged 737 juvenile yellowfin tunas off Baa Atoll, in the northwest of the country. Each tuna was injected with oxytetracycline (OTC) prior to being tagged and released. Orange tags were used to differentiate these fish from the normal yellow-tagged fish that had been released on previous occasions.

There are plans to carry out a second yellowfin tuna OTC marking and tagging trip in December, targeting juveniles that appear off the east coast of the Maldives during the northeast monsoon. The goal for this second trip will be 300 fish, which would bring the total number of juvenile yellowfin tagged and OTC marked to over 1,000.

There is considerable controversy among tuna biologists over the growth rate of juvenile yellowfin tuna in the Indian Ocean. Some biologists suggest a "slow rate" of about 1.5 cm/month, while others insist that a "fast rate" of about 3 cm/month is correct. This difference has profound implications for stock assessment. Indian Ocean yellowfin tuna catches have increased dramatically in recent years, and there is some concern about stock status. Otolith ageing of Indian Ocean tuna has recently been carried out, and supports the "fast growth" hypothesis. However, in that study the daily nature of the otolith rings was not validated. The aim of this tagging experiment is to calibrate the periodic nature of the otolith rings in Indian Ocean yellowfin tuna, thus providing vital information for the calculation of growth rates and, ultimately, for carrying out stock assessment.

MRS had originally planned to carry out tagging and OTC marking of skipjack tuna during August. Four hundred ninety-six skipjack had been OTC marked and tagged during earlier trips. Initial results from recaptured fish suggest daily deposition of otolith rings. Further tagging was planned to confirm these results. However, as more otoliths were examined and results were analyzed it became clear that otolith ring deposition was irregular in Maldivian skipjack. It was then decided to carry out OTC marking and tagging of yellowfin.

MRS expects that most recoveries of OTC-marked yellowfin will be made by Maldivian fishermen. The program has been highly publicized locally in order to maximize returns of whole orange-tagged fish to MRS. Fisheries workers throughout the Indian Ocean and at canneries throughout the world are requested to keep a special look out for orange-tagged yellowfin. These tags are marked with MRS's fax number and details of information required, including a request to collect the otoliths (which needs to be done by skilled personnel). Rewards of T-shirts will be given: one for the tag with recapture information and three if the otoliths are returned as well.

An abstract from a recently published paper written by a SWFSC scientist is presented in this space to announce its availability and to report results of tuna research conducted by Center staff.

RECENT SWFSC PUBLICATION: "A Review of Temperature and Oxygen Tolerance Studies of Tunas Pertinent to Fisheries Oceanography, Movement Models and Stock Assessments"

Richard W. Brill, Honolulu Laboratory, Southwest Fisheries Science Center, National Marine Fisheries Service, 2570 Dole St., Honolulu, Hawaii 96822-2396. *Published in Fisheries Oceanography 3:3, 204-216, 1994.*

Detailed data on the physiological abilities and habitat requirements of some tuna species have now been collected. Laboratory and field studies show tunas are not strictly prisoners of their own thermoconserving mechanisms, but have rapid and extensive control over the efficacy of their vascular countercurrent heat exchangers. Skipjack tuna (*Katsuwonus pelamis*) are, therefore, probably not forced out of formerly suitable habitat as they grow because of the potential for overheating, as formerly thought. Because of their thermoregulatory abilities, bigeye tuna (*Thunnus obesus*) apparently can exploit food resources well below the thermocline by minimizing rates of heat loss when in cold water, and then maximizing rates of heat gain from the environment during brief upward excursions into the warmer mixed layer.

Widely cited estimates of limiting oxygen levels, based on estimated metabolic rates at minimum hydrostatic equilibrium swimming speeds, are not accurate because tunas have exceptionally high oxygen demands even at slow speeds. High metabolic rates, even at slow swimming speeds, most likely result from

the high osmoregulatory costs engendered by tunas' large thin gills and/or their other adaptations for achieving exceptionally high maximum metabolic rates. Recent laboratory research and modelling efforts suggest the capacity of tunas' cardiorespiratory systems to deliver oxygen at extraordinarily high rates was evolved to allow rapid recovery from strenuous exercise, rapid digestion, and high rates of gonadal and somatic growth, not high sustained cruising speeds. The rate at which reduced ambient oxygen levels prolong the time required for tunas to recover from strenuous exercise appears to be a good index of habitat suitability, with respect to oxygen.

RECENT DEVELOPMENTS IN TUNA FISHERIES

Editor's note: The following news items, compiled from fishery trade and industry journals, newspapers and NMFS reports, are provided only as a service to our readers. The NMFS does not guarantee their accuracy.

UNITED STATES

Scientists Track Large Yellowfin Tunas off Hawaii-- This summer, NMFS Honolulu Laboratory scientists caught and outfitted large (140-200 lb) yellowfin tunas with ultrasonic transmitters, and tracked the fish for periods of 10 hours to 3.5 days. Surprisingly, these fast-swimming, "highly migratory" fish seldom traveled beyond eight miles from shore. One fish actually followed the tracking vessel, rather than vice versa. Signals from one fish that were lost in an early track were later received while following another fish, suggesting schooling. Biologists are studying tuna movements in order to increase scientific knowledge about these fish caught by both commercial and recreational fishermen in Hawaii. (NMFS Southwest Region's *News Briefs*, Fall 1995)

Proposal to Lift Ban on Non-Dolphin-Safe Tuna-- Proposed legislation, sponsored by Representative Randy (Duke) Cunningham of San Diego, would lift the ban on the importing of foreign tuna caught in association with dolphins and repeal a consumer labeling law that requires all tuna sold in the United States to be marked "dolphin-safe." Many environmentalists concede that new international trade treaties mean the tuna embargo should be lifted, but only if replaced by strict international law and rigorous enforcement that makes sure dolphin deaths continue to decline. (*Los Angeles Times*, September 9, 1995)

Albacore Fishermen Settle with Canner-- Dozens of albacore trollers will settle for 75¢ on the dollar for over $2 million in debts owed them by a U.S. West Coast canner that bought their fish last summer and fall, but failed to pay them in full. The settlement partially resolves a stalemate caused by Pan Pacific Fisheries' slow payment or non-payment of "tuna checks" from bountiful harvests nearly 1,000 miles west of Washington State. Many trollers traveled from those grounds to deliver to the Los Angeles-based canner to save themselves nearly $300/ton in trucking and transshipment costs they'd have to pay by unloading at the nearest convenient port.

"It's not unusual for a canner to pay fishermen a certain amount upfront, then describe terms by which the balance will be paid," explained Bill Perkins, head of the Western Fishboat Owners Association. "But by springtime, Pan Pacific still wasn't making payments. Some guys took no money down and they really got hurt–so badly that they're having trouble scraping up money to fish this season. According to the settlement agreement, trollers will be paid in full by mid-August. (*National Fisherman*, September 1995)

Coast Guard Grabs Driftnetter- - The U.S. Coast Guard cutter *Rush* chased a fleeing driftnet fishing ship about 600 miles north of Midway Island and finally succeeded in stopping it by tangling its propeller with a towing hawser. The drama played out July 15-20 after the 150-foot *Luyan BU 6006*, flying the flag of the People's Republic of China, was detected fishing illegally by an American fisherman in the area and videotaped by a Coast Guard C-130 patrol plane. When the ship was finally stopped, the boarding party found no documentation to support Chinese registry or that of any other country. The ship's hold was about one-quarter full of frozen squid, shark fins and tuna, with large amounts of drift net stowed on board. The vessel was seized by the Coast Guard for violation of the Magnuson Fishery Conservation and Management Act and was towed 1,242 miles to Guam where it was turned over to the U.S. attorney for further action. (*National Fisherman*, November 1995)

EASTERN PACIFIC

International Tuna-Dolphin Proposal-- On October 3, 1995, delegates from 11 tuna-exporting nations, meeting in Panama, signed the "Panama Declaration" which establishes a legal annual limit of 5,000 dolphins killed by purse seiners if the United States agrees to lift its embargo on importing tuna caught by encircling dolphins; the United States also signed this Declaration. A draft agreement was initially agreed to by five environmental groups (Greenpeace, World Wildlife Fund, Center for Marine Conservation, National Wildlife Federation, and Environmental Defense Fund) at meetings with Latin American government representatives in Huatulco, Mexico, on September 27, 1995. (Various sources, including Library of Congress)

WESTERN PACIFIC

Papua New Guinea to Develop Tuna Industry--Papua New Guinea has sustainable fishery resources in excess of 680,000 mt a year, most of it skipjack and yellowfin tuna, but to date this vast resource has been harvested almost entirely by foreign fleets. It appears that the situation will change markedly over the next three years due to a number of policy measures the government is implementing. The first to take effect will be a requirement to have all tuna longliners locally registered. No further licenses will be issued to foreign registered boats for that fishery. This move, coupled to promotion of local investment in the tuna fishery, will soon see over 100 longliners fishing under the PNG flag. The number of vessels may increase to 300 by 1998. The second major development in the domestication of the tuna industry is the establishment of tuna canneries in the country. Two large canneries have been approved and are now under construction. There is one fish cannery already in operation in PNG but it presently cans only imported mackerel. The two new canneries will process 45,000 and 25,000 tons of tuna, respectively, creating jobs for over 1,000 local workers. (*World Fishing*, October 1995)

Fiji-Korea Joint Venture--Joint venture tuna operations with the Republic of Korea and Taiwan have spurred more sales of fresh/chilled tuna and swordfish. Reportedly, eight tuna vessels belonging to these countries, together with another 12 local tuna boats, are fishing for sashimi tuna to supply four Fijian companies engaged in exports. Current landings from these vessels are about 60 mt a week. The main market for Fiji's sashimi tuna is Japan. Sashimi tuna from this origin has gained popularity in the Japanese market for the excellent product quality. (INFOFISH *Trade News*, September 15, 1995)

EASTERN ATLANTIC

Italian Tuna Canning Industry--The Italian tuna canning industry is ranked third in the world behind Thailand and the U.S. The industry is modern and well organized and produces a high value product, promoted by efficient marketing campaigns. Some 14 companies are involved in canning tuna in Italy, employing 5,500 workers. In 1994 the Italian canned tuna production was 86,000 mt, which was 4,000 mt less than in 1993, but well in line with the production in previous years. The total value of production was $480 million, 3.4% less than in 1993. Each year about 120,000 mt of raw tuna is processed in the Italian tuna canneries. (GLOBEFISH *Highlights*, September 15, 1995)

UPCOMING TUNA MEETINGS

(Organizer; meeting type: sci=science, adm=administration)

- NOV 13-17. Fourteenth Regular Meeting of the ICCAT. Madrid, Spain. (International Commission for the Conservation of Atlantic Tunas; adm)

1996

- MAY 20-23. 47th Tuna Conference. Lake Arrowhead, CA. (NMFS; sci)
- JUL 28-AUG 2. 2nd World Fisheries Congress. Brisbane, Australia.

Southwest Regional Office
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

Hilda Diaz-Soltero, Director

Southwest Fisheries Science Center
8604 La Jolla Shore Drive--P.O. Box 271
La Jolla, California 92038-0271

Michael F. Tillman, Science and Research Director, Southwest Region
Gary Sakagawa, Tuna Program Coordinator

PUBLICATION STAFF

Alan Jackson, Production and Circulation
David Au, Reports
Ken Raymond, Art Director

Send inquiries or comments to: Alan Jackson, P.O. Box 271, La Jolla, CA 92038-0271
TEL: (619) 546-7048 FAX: (619) 546-7003 EMAIL: ajackson@ucsd.edu

The ***Tuna Newsletter*** is also available on the Internet:
http://kingfish.ssp.nmfs.gov/swfsc/tunanews.html

U.S. OFFICIAL MAIL
LA JOLLA
DEC 15'95
CALIF.
PENALTY FOR PRIVATE USE $300
P.B. METER 2310866
U.S.POSTAGE
0.32

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE
SOUTHWEST FISHERIES SCIENCE CENTER
8604 LA JOLLA SHORES DR.- P.O. BOX 271
LA JOLLA, CALIFORNIA 92038-0271

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

LIBRARY, HONOLULU LABORATORY
NMFS/NOAA (F/SWC2)
2570 DOLE ST
HONOLULU HI 96822-2326